
Management of the Internet and Complex Services

European Sixth Framework Network of Excellence FP6-2004-IST-026854-NoE

Deliverable D4.2

Dynamic Dissemination environment framework & first integration with the collaboration environment

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Document Control

Title: Dynamic Dissemination environment framework & first integration with the collaboration environment

Type: Public

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Doc ID: D4.2-v1.1.doc

AMENDMENT HISTORY

Version	Date	Author	Description/Comments
V1.0	November 20, 2006	Joan Serrat	First version, providing the ToC and document structure
V1.1	December 22, 2006	Joan Serrat	Insertion of contributions from PSNC, UniS, UT and UPC

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1 Executive summary

In addition to the News section that presents all important events that happen throughout the project, the Documents section is the core of the site for dissemination purposes and it is divided in subsections like Books, Deliverables, Papers, Podcasts, Presentations, Research involving Emanics's partners, Standards & Drafts and Tutorials & Courses. All the documents are presented in various file formats (pdf, doc etc.) or even as links to external sites providing appropriate content.

The Software section presents results of the collection of available network management software and also offers the software produced or extended by the EMANICS participants. The Call for Papers section supports call for papers announcements published by the Simpleweb site and imported via RSS feed.

RSS feeds have been also implemented. Such RSS can be easily subscribed by the visitors using any RSS reader. Via RSS we currently cover the subscription to News, Call for Papers, Conferences and Podcasts.

Other sections like the Newsletter, the Links and the Site map complete the architecture of the public EMANICS site, the paradigm of our dissemination environment.

Podcasting consists in the creation and distribution of multimedia files such as audio or video over the Internet by using RSS feeds. These multimedia files can then be downloaded by applications that support RSS (e.g., iTunes) and played on mobile devices and personal computers. EMANICS has been learning these techniques for dissemination purposes. A complete podcast on an event of the NOMS 2006 conference has been produced following a process consisting of the creation of the artwork, edition of the audio files with the speaker's speech, insertion of presentation slides in PNG format into the development software, synchronization of the presentation slides with the speakers' speech, creation of the XML podcast file and finally, the publication of the podcast along with its respective episodes on a website.

A network and service management portal has been developed with the objective to serve as the guide for future information portals. Currently it is structured around two categories of pages, namely Group content pages and Individual content pages. In its current status there are 5 group content pages, namely Main, General description & contents, IP networking, Network/Service management and MANET management. Similarly, we have implemented and provided appropriately structured content for content pages like Multicast management, Admission control, Interdomain traffic engineering, Survivability / Resilience, Policy Analysis, Policy-based QoS Management, Web services / XML –based management, MANET management, Context-awareness and Service discovery/provisioning.

The EMANICS collaborative environment is structured around different levels. The first levels contains areas like Project, Deliverables&Documents, Meetings, Contract&Finance, Phase-II DOW Elaboration and the Internal document upload centre.

Also integrated in the collaborative environment, the on-line Application Forms allow partners to submit funding requests for publication of books, attendance to conferences and summer schools, attendance to standardization meetings, publication of papers in magazines and conference proceedings, participation in PhD committees, PhD student mobility, short term scientific visits and setup of courses, tutorials and training activities.

2 Introduction

In order to facilitate the collaboration among people there must be the appropriate tools and established protocols; namely a framework for exchange of information. The most paradigmatic example nowadays is the World Wide Web and its associated technologies. Industry and academia rely on it for dissemination and collaboration purposes. The EMANICS NoE was established in order to strengthen the links and foster the collaboration among leading network and service management centres in Europe. In this sense, it is apparent that EMANICS uses these technologies. Dissemination of information is a crucial activity in the scope of our Network of Excellence. This is, first of all, because it will facilitate the collaboration of the Consortium members through the Network. But, in addition, this activity will serve to convert EMANICS in a beacon of the network and service management domain at European level and even worldwide that will in turn facilitate the recognition and growth of our community.

Nevertheless, the creation of a dissemination and collaboration framework is not as straightforward as filling a template to create a personal web page. The problem is more complex and therefore it must be faced starting with the establishment of a set of specifications and requirements. Then a careful selection of available technologies must follow and at a later stage the design and development will close the loop. But a loop that is always circulating in the sense that modifications of any type must be possible at any time. And this is specially the case for EMANICS because it was necessary to provide a provisional solution from the same kick-off meeting date and because EMANICS is wishing to use state of the art technology that requires testing and evaluation.

The initial approach was outlined in a previous document [1]. Summarising, the dissemination process would be based on a dynamic and open content management system of easy maintenance and customization. Effort would be paid on investigating the most new multimedia dissemination techniques and also in structuring the huge amount of information currently available on our domain. Four EMANICS partners shared the responsibility to carry out the work and the results at the end of one year of activity are presented hereafter.

Following the Executive Summary and this introduction, Section 3 comes where we describe the main aspects of our dynamic dissemination environment. This section is structured around three lines; namely the web site, podcasting-based dissemination and content dissemination via specialized portals. For the web site we detail its architecture with instructive screen snapshots of the main windows. In the subsection devoted to podcasting we detail the steps followed to create a podcast along with what we learnt about the different available technologies. Finally, the sub section devoted to content portals presents the design and architecture of our initial QoS Management portal, the seed for future portals.

Section 4 is devoted to present the collaboration environment. Although integrated in the former, the collaboration environment is only accessible to project members and allow them to share documents and files, provide information about past and future meetings, access official project documents, collaborate on particular tasks within work packages using a Wikipedia-like interface, access deliverables list per due date and deliverables repository and submit applications for funded activities within the NoE via a service of online forms.

Sections 5 to 7 are devoted to present the conclusions of this work, the references and the abbreviations respectively.

3 Dynamic dissemination environment

3.1 The EMANICS web site

A project website is a common and effective method of dissemination of information. The public part of the Web site is accessible for everyone in the Internet since the beginning of the project. The first version of the site was based on the initial structure, layout and content prepared and hosted by INRIA since the beginning of the project. Initially the site was based on a static html structure which caused several limitations especially with regular and easy updating of the new content and extending the site with new tools required for modern dissemination.

A few months after the project kick-off a new version of the site was developed and hosted by PSNC. The new version technical details, requirements and the details of the transition phase were presented in the previous document [D4.1]. The website is nowadays completely operational and available at <http://www.emanics.org>, being continuously extended and maintained based on daily tasks throughout the project. The following sections describe the structure of this web site.

3.1.1 EMANICS general presentation pages

The main goals of the project and the goals of activities performed in each of work packages are presented in the following sections (menu items):

- Welcome

On the welcome page a short introduction to the project and highlights of the most important news are presented.

- About

This section presents the main goals of the project.

- Activities

This section presents one page description for each of the work packages.

- Partners

This section presents the name of the institution of each partner together with their logo.

- Contact

This section presents the coordinates of the project leaders.

Figure 1 is a pictorial composition of the above mentioned sections. The published content is rather static (besides the highlighted dynamic news items displayed on the welcome page) because it shows general theses which are constant throughout the project. However, despite the static content, thanks to implemented dynamic Content Management System [2], each part of the content can be easily and quickly changed. It concerns all sections of the site.

The figure displays five overlapping screenshots of the EMANICS website, showing the 'Welcome', 'About', 'Activities', 'Partners', and 'Contact' pages. Each page features a consistent header with the 'Information Society Technologies' logo and the 'EMANICS' title. A left-hand navigation menu is present on all pages, listing links such as 'Welcome!', 'About', 'News', 'Newsletter', 'Activities', 'Documents', 'Software', 'Positions', 'Call For Papers', 'Links', 'Partners', 'Contact', and 'Site Map'.

Welcome Page: The main heading is 'European Network of Excellence for the Management of Internet Technologies and Complex Services'. It describes EMANICS as a Network of Excellence supported by the European Commission Information Society Technologies 6th Framework Program, bringing together 13 of the best research teams across Europe. It mentions that EMANICS addresses challenges in scalability, dynamics, security, and automation. A sidebar highlights the 'IFIP/IEEE DSOM'2006 Best Paper Award' won by Burgess and Gard Undheim from Oslo, and notes the 'First EMANICS contribution to an IETF standard'.

About Page: This page details the network's main objective: to extend European leadership and expertise in network and service management. It states that research integration is achieved through a common vision of major challenges, complemented by specific targeted joint research actions. The management themes listed are: Management Foundations, Management Technologies, and Management Applications.

Activities Page: The 'Project Structure' is outlined in a table:

Integration Activities	Dissemination Activities	Joint Executed Research Activities
WP0 - Project Management	WP4 - Electronic Dissemination Environment	WP7 - Scalable Management
WP1 - Long Term Vision and Integration Programme	WP5 - Training, Standardization and Technology Transfer	WP8 - Economic Management
WP2 - Virtual Laboratory and Common Testbeds	WP6 - Open Source Initiatives and Joint Software Development	WP9 - Autonomic Management
WP3 - Conference and Workshops		

Partners Page: This page lists the consortium members with their logos and names: Caisse des Depots et Consignations (CDC) France, INRIA (INRIA) France, University of Twente (UT) The Netherlands, Imperial College (IC) United Kingdom, International University Bremen (IUB) Germany, and KTH, Royal Institute of Technology (KTH) Sweden.

Contact Page: This page provides contact information for the Scientific Leader (Olivier Festor, INRIA, France), the Coordinator (Jean-Noel Forget, CDC France), and Activity Leaders for Integration (Gabi Dreio, The University of Federal Armed Forces Germany), Research (Aiko Pras, CTIT, University of Twente, The Netherlands), and Dissemination (Juergen Schoenwaelder, International University Bremen, Germany). A footer note mentions 'vebmaster: Bartosz Gajda' and a contact email 'emanics-psnc@lists.man.poznan.pl'.

Figure 1. EMANICS Welcome, About, Activities, Partners and Contact WebPages

3.1.2 News

News section of the site presents all important events that happen throughout the project. Each news is displayed as a single item with attributes like: title, date of publishing, leading text. Each news is entered separately in forms through the Members Area of the site.



Figure 2. News and RSS feed

3.1.3 Newsletter

Another dissemination mechanism is the project newsletter that is being prepared on a quarterly basis and published on the public website as a pdf file.

There is also implemented a mechanism for subscription for receiving the newsletter by email. This functionality is available for public access. Appropriate subscription form is available from the newsletter page:

The screenshot displays two web pages from the Information Society Technologies website. The top page, titled 'Newsletter', features a sidebar with links: Welcome!, About, News, Newsletter, Activities, and Documents. The main content area includes a heading 'Newsletter' and a link 'Here you can subscribe for Emanics Newsletters'. Below this, two newsletter issues are listed: 'Newsletter Issue 1 - March 2006 (PDF)' and 'Newsletter Issue 2 - July 2006 (PDF)', each accompanied by a small thumbnail image. The bottom page, titled 'Newsletter Announcements', has a similar sidebar with an additional 'Software' link. The main content area shows the title 'Newsletter Announcements', a description 'Description: Newsletter Announcements', and a section 'Input your details:'. This section contains input fields for 'Name:' and 'Email:', a checked checkbox for 'Receive HTML mailings?', and a 'Subscribe' button. At the bottom of the page, a footer reads 'Yanc 1.4, beta 3 component by Adam van Dongen - TIM_online'.

Figure 3. Newsletter and newsletter subscription form

The subscription and email announcement mechanism is based on an additional tool implemented on the site.

3.1.4 Documents

This section is the core of the site for dissemination purposes and it is divided in the following subsections:

- Books
- Deliverables
- Papers
- Podcasts
- Presentations
- Research involving Emanics's partners
- Standards & Drafts
- Tutorials & Courses

Every document published in any of the above subsections contains the following attributes: title, author, short description, file date, submitting date, file size, number of downloads and file type.

All the documents are presented in various file formats (pdf, doc etc.) or even as links to external sites providing appropriate content. For instance, the Podcast subsection was implemented as links to the Simpleweb site at www.simpleweb.org, which is also enhanced within the project.



Figure 4. The different items in the Documents subsection


The downloading, uploading and presentation file mechanisms are based on an additional tool implemented on the site; namely, the Repository 3.40 component for Joomla CMS. In order to improve the original layout for presenting files by Repository component and to perform customisation of some attributes of the published files, the component PHP code has been partly corrected and rewritten. Also a CSS customization was performed to suit the layout of the whole site.

3.1.5 Software

This section presents results of the collection of available network management software, making it available to the public in a homogeneous and open way. In addition, it also offers the software produced or extended by the EMANICS participants [3]. The tools presented were gathered, tested and described within Workpackage 6.

For the purpose of presenting the Emanics inventory and repository for the management tools a new Joomla component was implemented on the site; namely the DBQ Manager.

The repository consists of the MySQL database with repository content and configuration tables. The search mechanism with the web-interface has open access for everyone while the “Add software” functionality is accessible only for registered users of the site. The table of selected software listed in the Emanics public repository is ranked by the SimpleWeb.org and the Emanics project participants as the best software packages. The Emanics inventory consists of the open source software packages selected from the public repository and supported by this project.



[Welcome!](#)
[About](#)
[News](#)
[Newsletter](#)
[Activities](#)
[Documents](#)
[Software](#)
[Emanics inventory](#)
[Search repository](#)
[Positions](#)
[Call For Papers](#)
[Links](#)
[Partners](#)
[Contact](#)

Welcome to Emanics Repository of Network Management Software

The best software packages listed in the Emanics public repository are selected for you below

Name	Source	Description	More
Cacti	Ian Berry	RRD Front-end	More
Ethereal	Gerald Combs	Ethereal is a network protocol analyzer for Unix.	More
libsmi	TU Braunschweig	A library to access SMI MIB information	More
MRTG	T. Oetiker and D. Rand	A tool to monitor the traffic load on network links.	More
net-snmp	Univ of California, Davis	Various tools relating to the Simple Network Management Protocol	More
ntop	Luca Deri	A tool that shows the network usage, similar to what the popular 'top' Unix command does.	More



[Search public repository](#)

Figure 5. Main window after opening the Software section

3.1.6 Positions

This section offers the currently available offers from EMANICS partners.

3.1.7 Call for Papers

This section supports call for papers announcements. These announcements are published by the Simpleweb site. To avoid duplicity, the content published by Simpleweb is imported via RSS feed. Then, a special component implemented on Joomla, the RSS Reader2, parses the RSS feed and displays the content in the

dynamic table of this section. The RSS feed importing and parsing is done a few times per day.

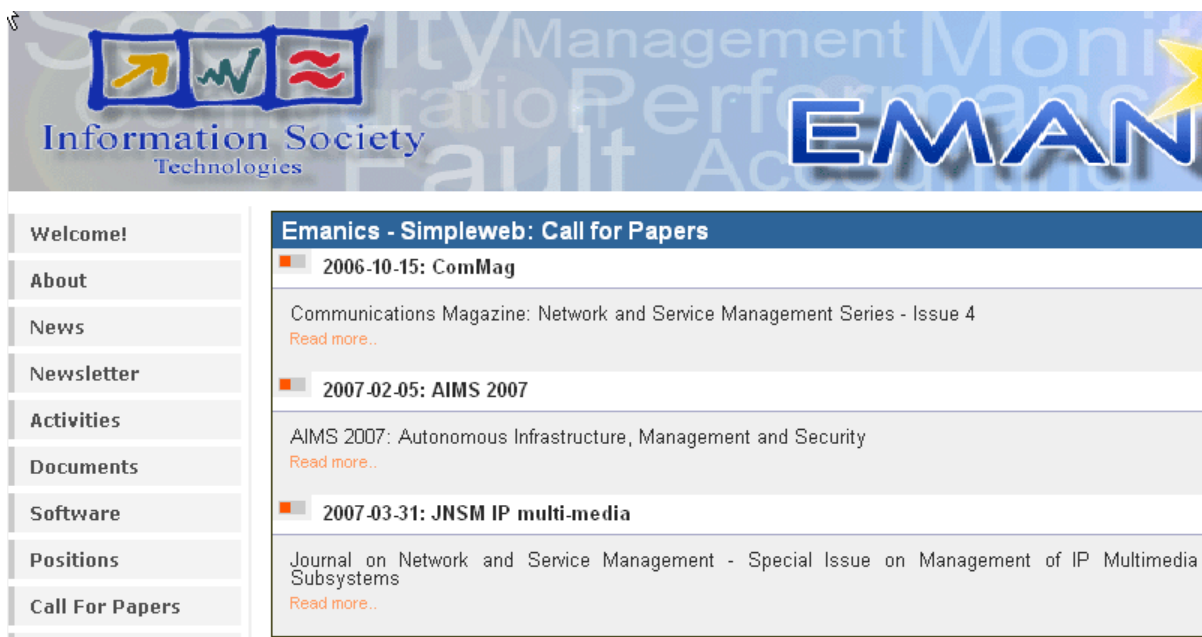


Figure 6. The Call for Papers section

3.1.8 Links

This section contains links to other network management oriented sites. The section is quite dynamic and fashion looking. A pop-up window appears while the mouse pointer moves above the URL. The pop-up presents additional information like date of publishing and publisher. Moreover, for each of the urls there is a small thumbnail screenshot preview of the site. This feature is enabled thanks to the free thumbshots service from site www.m-software.de/thumbshots.

This section is using another extra component implemented on Joomla called Bookmarks.

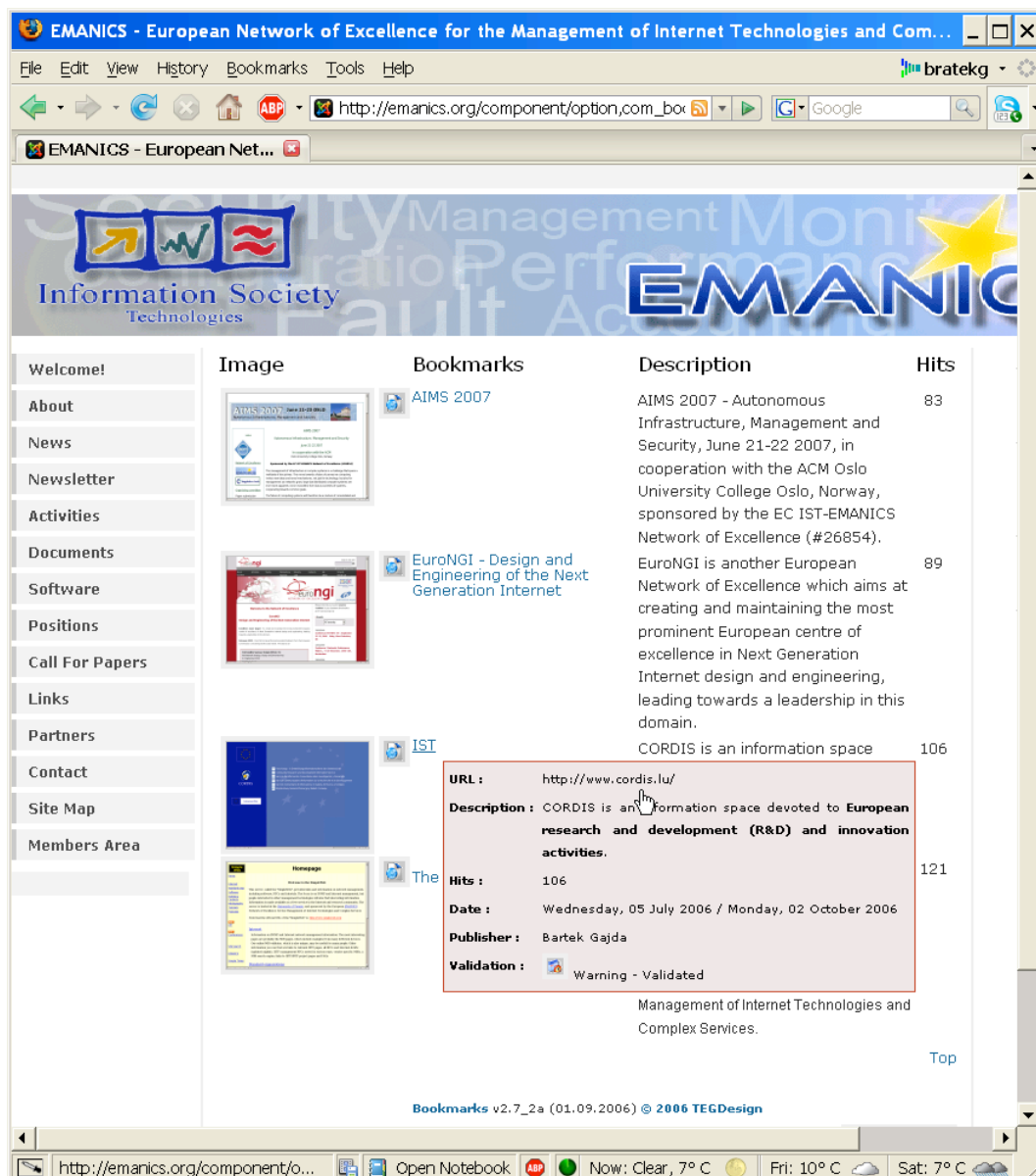


Figure 7. The Links section showing the pop-up appearing when the mouse moves over the Cordis URL

3.1.9 Site Map

This is a common section in web sites with content generated automatically presenting menu items with all expanded submenu items. This section is using another extra component implemented on Joomla called Joomap.



Figure 8. The Site Map section window

3.1.10 RSS feeds

RSS feeds (RSS version 2.0) have been implemented with URL links published on the right panel of the site, which is visible from all sections [6]. Such feed can be easily subscribed by the visitors using any RSS reader like the built in FireFox, Internet Explorer 7 or other stand alone readers.

- News

The RSS feed is generated automatically based on entered news items. No human interaction is necessary.

- Call for papers

It presents a link to an external RSS feed with Call for papers announcements at <http://www.simpleweb.org/cfp.rss>

- Conferences

It presents a link to an external RSS feed with conference announcements at <http://www.simpleweb.org/conferences.rss>

- Podcasts

Another graphical link advertising internal section of documents as described in the following section of this document

3.2 Podcasting based dissemination

Work in this area has concentrated on the creation process of a podcast based on the Distinguished Experts Panel (DEP) event, which took place at the NOMS 2006 conference in April 6, Vancouver, Canada. The DEP meeting was composed by 5 panellists who presented their works and debated about VoIP management. As a result of this meeting, 6 podcast episodes have been created: 5 episodes related to the panellists' presentation and 1 episode related to the debate. The process of creating these episodes is described hereafter.

3.2.1 Principle of operation

Podcasting consists in the creation and distribution of multimedia files such as audio or video over the Internet by using RSS (Really Simple Syndication) feeds [4]. These multimedia files can then be downloaded by applications that support RSS (e.g., iTunes) and played on mobile devices and personal computers. The term podcast can mean both the content and the method of delivery.



Figure 9. Podcast episodes in iTunes

3.2.2 Used tools

In order to create the DEP podcast episodes, the following software were used:

- GarageBand 3 (version 3.0.2)
- Keynote (version 3.0.1)
- Podcast Maker (version 1.2.5)
- Microsoft PowerPoint 2004 for Mac (version 11.2.4)

GarageBand 3 was the main software used to create the DEP podcast episodes due to its features for creating podcast episodes. It is interesting to mention that those features do not exist in GarageBand 2 and earlier versions. In addition to the features for creating podcast episodes, GarageBand 3 also provides features for editing audio files,

which allows, for instance, the removal of background noise or long periods of silence in the audio records.

Keynote was used for creating episode artworks, which consists of images used for representing podcast episodes. An episode artwork can be compared to, for example, the front cover of a book.

Podcast Maker was used to create the XML file needed to publish DEP episodes from a website. The resulting XML file was later modified by hand.

PowerPoint for Mac was used to convert the panellist's slides into PNG files, which are supported by GarageBand 3, in order to create the podcast episodes.

3.2.3 Creating the DEP podcast episodes

The creation of the DEP podcast episodes basically consisted of the followings steps:

- Creating the artwork episodes for each episode.
- Editing of the audio files with the panellists' speech.
- Inserting the slides in PNG format into GarageBand 3.
- Synchronizing the slides with the panellists' speech.
- Creating slide chapters (optional).
- Creating the XML podcast file.
- Publishing the podcast along with its respective episodes on a website.

3.2.3.1 Creating artwork episodes

One artwork episode was created for each DEP podcast episode using Keynote. The artwork episode basically consists of a slide with information describing that episode.

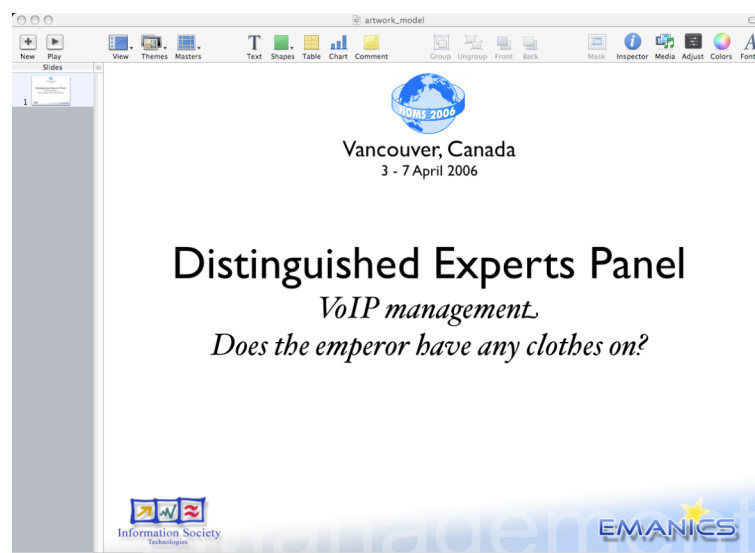


Figure 10. Creation of an artwork episode in Keynote

3.2.3.2 Editing the audio files

Since the original audio files contained some parts with long period of silences, background noise and some non-understandable conversation (e.g., problems with the microphone), these audio files had to be edited. The software used for that was the GarageBand 3, which includes features to improve the quality of audio files.

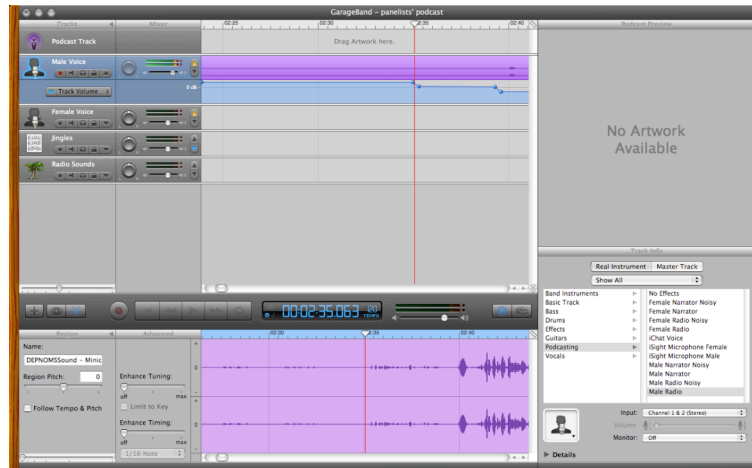


Figure 11. Editing audio files in GarageBand 3

3.2.3.3 Inserting the panellists' slides

The original panellists' PowerPoint slides formats were converted into PNG files, which are supported by GarageBand 3. This step is quite straightforward and it did not demand much effort.

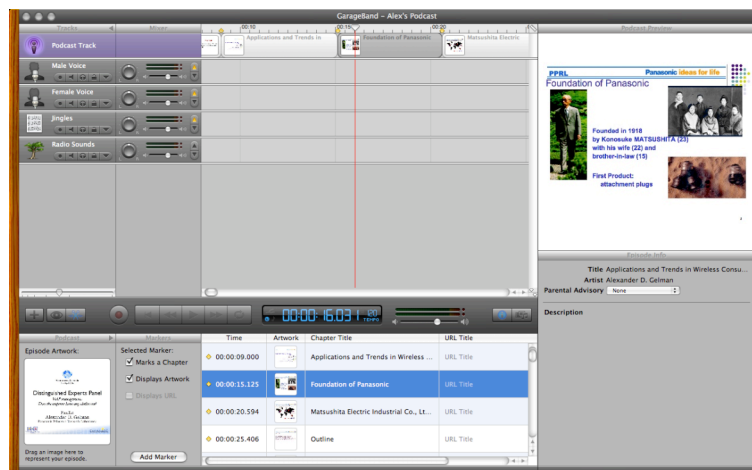


Figure 12. Inserting PNG slides in GarageBand 3

3.2.3.4 Synchronizing the slides with the panellists' speech

This step was the one that required most effort. For achieving the required synchronization, all audio tracks had to be played multiple times and the slides had to

be precisely positioned according to the topic explained by the panellists at that moment.

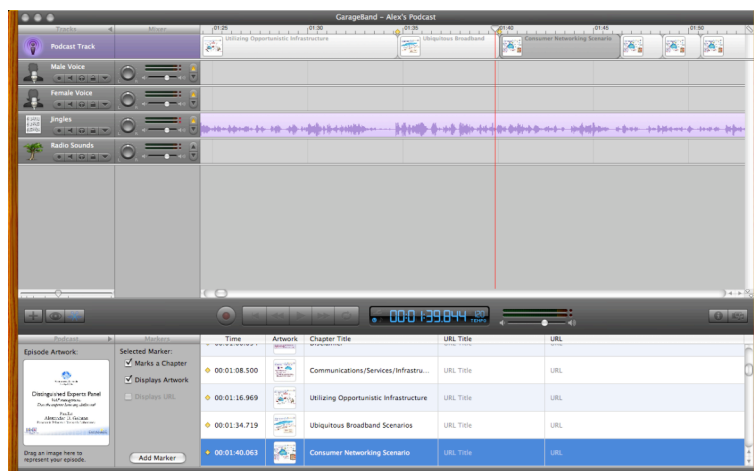


Figure 13. Synchronizing the slides with panellist's speech in GarageBand 3

3.2.3.5 Creating the slide chapters

This step was not strictly necessary, but it helped to better organize the DEP podcast episodes. By creating chapters in the episodes, a better navigation through the topics presented by the panellists becomes possible.

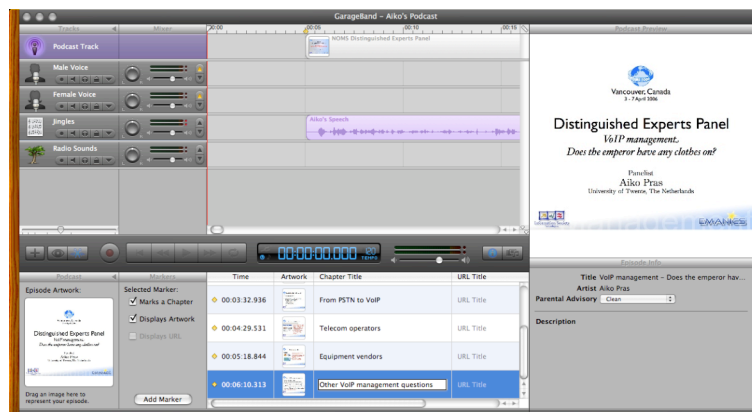


Figure 14. Creating episode chapters

3.2.3.6 Creating the XML podcast file

Once all episodes were finished, they were grouped into the DEP podcast by using the Podcast Maker tool. This tool basically generates the RSS feed (coded in XML) that contains information about the DEP podcast itself such as title and description and as well as information about the created episodes. The XML file was later modified by hand, and checked for correctness via <http://www.feedvalidator.org/>. Amongst others,

modifications were needed to generalize the description and allow addition of future episodes.

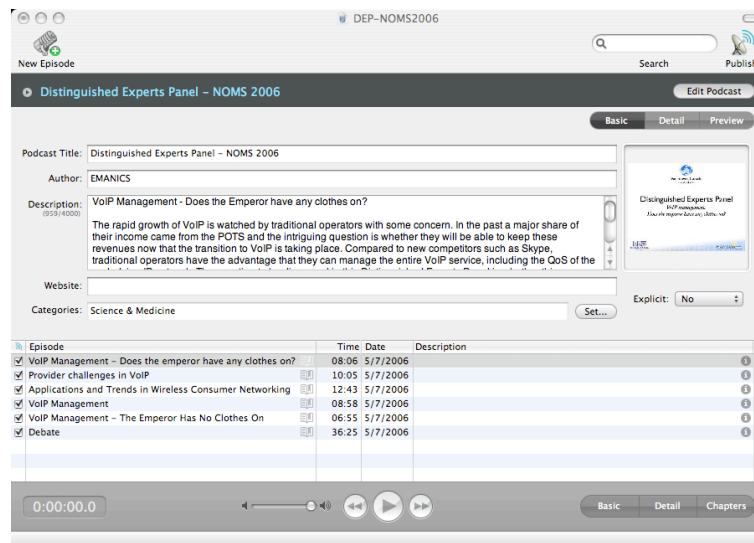


Figure 15. Creating the DEP podcast

3.2.3.7 Publishing the DEP podcast

The last step consisted in publishing the DEP podcast along with its episodes on a website. This was done through SFTP connections, which are supported by the Podcast Maker. The file extension was .rss

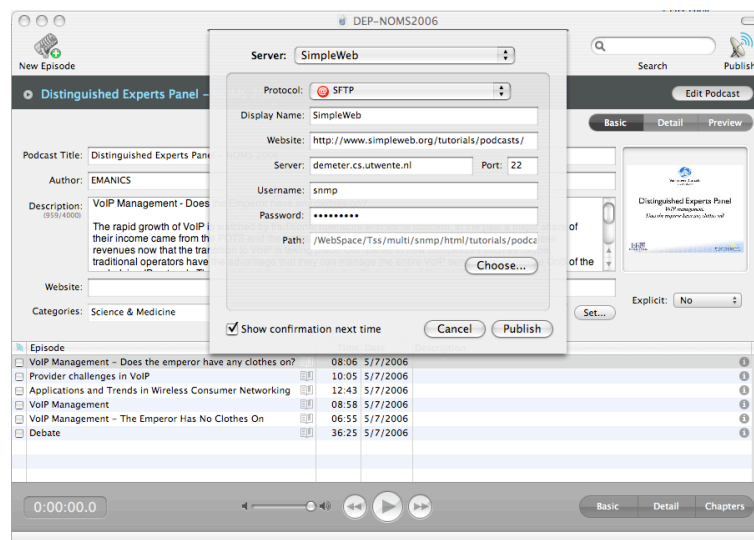


Figure 16. Publishing the DEP podcast

3.2.4 Server side configuration

An important thing to think of is to provide the right permissions to the uploaded files. Also the website should support podcast files. For this purpose, the .htaccess file was modified to include:

AddType text/xml rss

AddType audio/x-m4a m4a

3.2.5 Client side configuration

3.2.5.1 QuickTime

QuickTime is currently the best software to play the DEP podcast episodes. QuickTime enables the episodes to be played in full screen and as well as the navigation through the episode chapters.

3.2.5.2 iTunes

In order to allow iTunes to access the DEP podcast episodes, a podcast subscription must be done by providing the RSS feed of the DEP podcast.

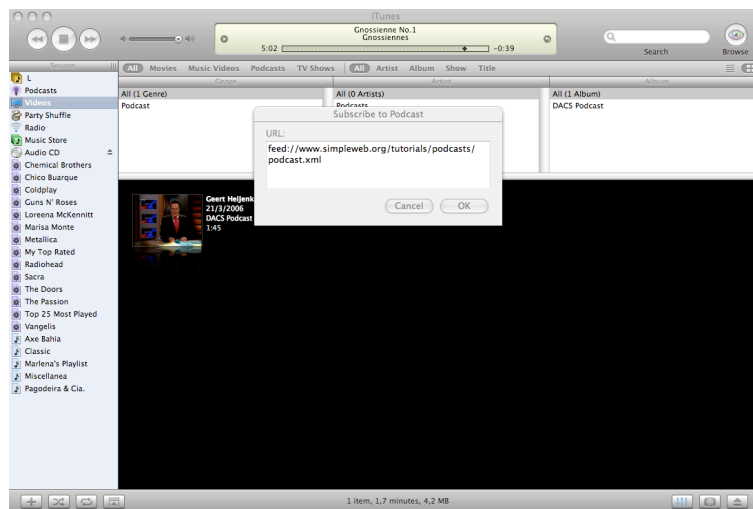


Figure 17. Subscribing to the DEP podcast

When this step is done, iTunes will connect to the DEP podcast website and it will show the available DEP podcast episodes to be downloaded. In addition, iTunes will regularly check for new episodes whenever they are available [5].

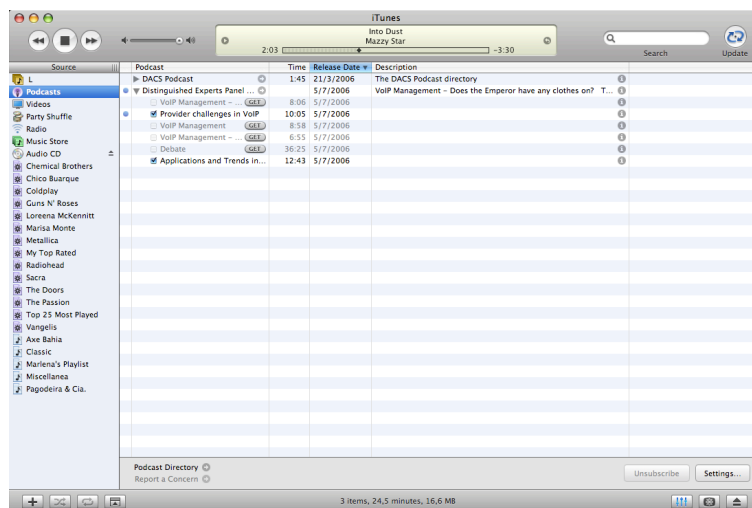


Figure 18. Getting the DEP podcast episodes

3.2.5.3 iPod

The DEP podcast episodes can also be watched in iPods. In order to do that, the episodes have to be downloaded and transferred into iPods by using iTunes.

3.2.5.4 Safari

Safari is a browser that supports RSS feeds, so that the DEP podcast episodes can be downloaded and played by using QuickTime or iTunes. In addition, Safari also makes easier the podcast subscription in iTunes.

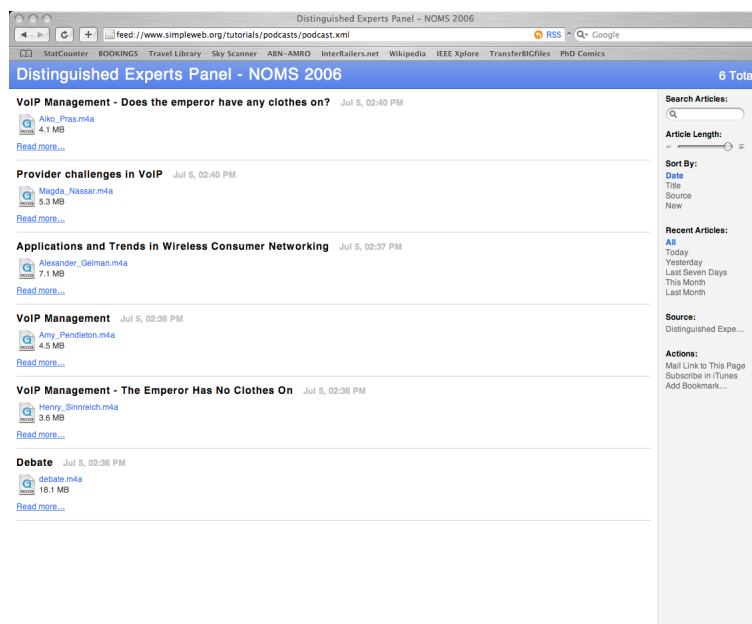


Figure 19. Using Safari to access the DEP podcast episodes

3.2.6 Open issues

Some issues were found when this work was developed. The issues are:

- iTunes does not play the DEP podcast episodes in full screen mode:

This is a problem reported by many users in the Apple mailing lists, but no proper answers are provided. iTunes properly plays the episodes in a small screen at bottom left, but when the full screen mode is chosen the slides are not updated.

- GarageBand 3 limits the size of the slides to 300 x 300 pixels:

GarageBand 3 limits the size of the slides and artwork episodes to a square of 300 x 300. There is an option in GarageBand 3 that allows not using this size limitation, but when the episodes are exported, some parts of both left and right slide margins are omitted.

3.3 Content dissemination via specialised portals

One major aim of EMANICS is to structure and integrate the existing and ongoing research in network and service management primarily in the European realm. The purpose of this is twofold, namely to solidify and categorise innovation and research in the field and through this understanding and monitoring to design and devise next generation management frameworks.

To achieve this objective, one of the major activities involved in WP4 is the integration of related content in the field of network and service management and its electronic dissemination to the public. For this purpose the content referring to network and service management should be collected, organised, presented and disseminated through a web-based information portal conforming to a standardised format to ensure public accessibility and incessant availability of related and up-to-date information.

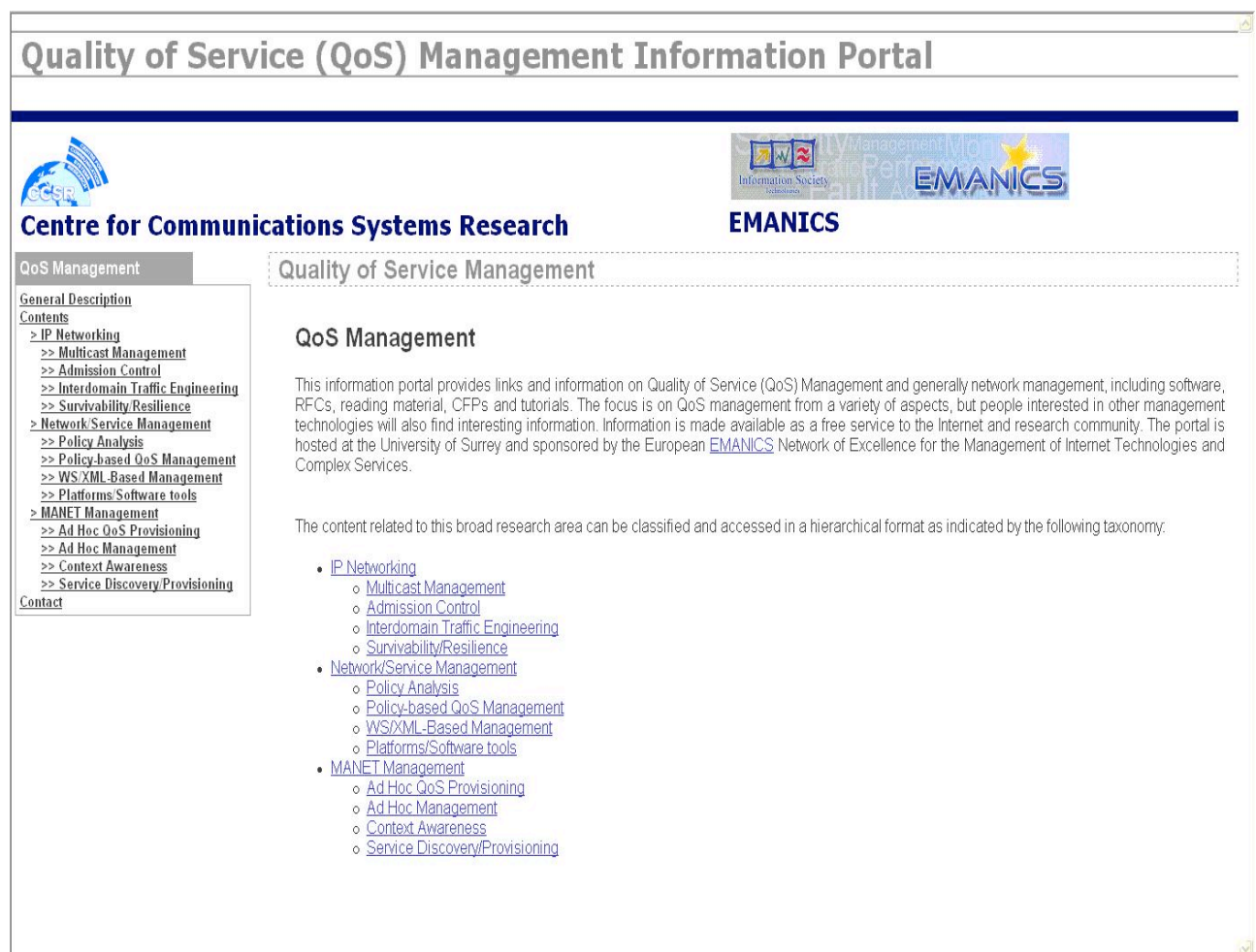


Figure 20 Main view of the QoS Management Information Portal

Based on a comprehensive requirements analysis regarding such an information portal and the derived set of design guidelines that constituted our initial work on the subject and that were presented in [1], we proceeded in implementing and deploying such an information portal (Figure 20). The content dissemination environment, hereinafter

referred to as information portal, will present all the research and development work and views on network and service management, while in parallel it will provide assistance to those initiating their involvement in the field with the use of tutorials and introductory material. Current research and related society news and conferences will be another aspect of this information portal as well as the possibility of establishing collaboration and communication links with experts in the field.

Due to its inherent diversity and the vast amount of information regarding the domain of network and service management, content integration so far refers to a sub-field of network management, that of "Quality of Service Management". The discussion and design can be extrapolated to incorporate the general field of network and service management, since it follows a hierarchical approach of presenting related content, with higher layers of abstractions integrating more specialised topics. In future steps and with the contribution of all EMANICS members and possibly the wider research community integration of further content will lead to a generic scope information portal that will serve one of its primary objectives, that of being a wider information dissemination portal on network and service management.

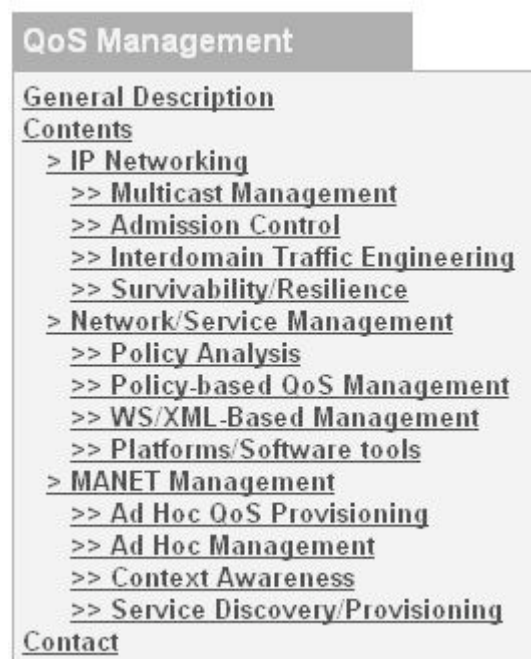


Figure 21 Navigation menu for QoS Management Information Portal

As far as the Quality of Service (QoS) Management information portal is concerned, we have identified the following categories of content to be integrated:

- **IP Networking**
 - Multicast management
 - Admission control
 - Interdomain traffic engineering
 - Survivability / Resilience
- **Network/Service Management**

- Policy Analysis
- Policy-based QoS Management
- Web services / XML –based management
- **MANET Management**
 - MANET management
 - Context-awareness
 - Service discovery/provisioning

It is evident that the list of categories and sub-categories does not mean to be exhaustive, rather indicative of the various and most representative aspects of the diverse domains that fall under the QoS Management umbrella. The non-functional requirement of extensibility satisfies the introduction of new categories and content by the administrators of the content integration environment and their delegates with sufficient authorisation privileges. Figure 20 presents the main page that a user is introduced to when accessing the information portal. The driving force of our implementation was simplicity of design, ensuring nevertheless full functionality. Consistency in content representation among the various pages that constitute the information portal is of paramount importance.

The users of the information portal when first accessing it are faced with a left hand side menu bar that will assist them in navigating through the information portal (Figure 22). This navigation menu is always present in every page of the portal, to ensure that users retain a uniform view of interaction with the portal. The right hand side of the portal is dedicated to the related content as this was selected through the navigation menu or from another internal link. A grey-box framed title establishes the topic of the accessed web page.

There are two categories of pages in the information portal, namely the following:

- Group content pages and
- Individual content pages

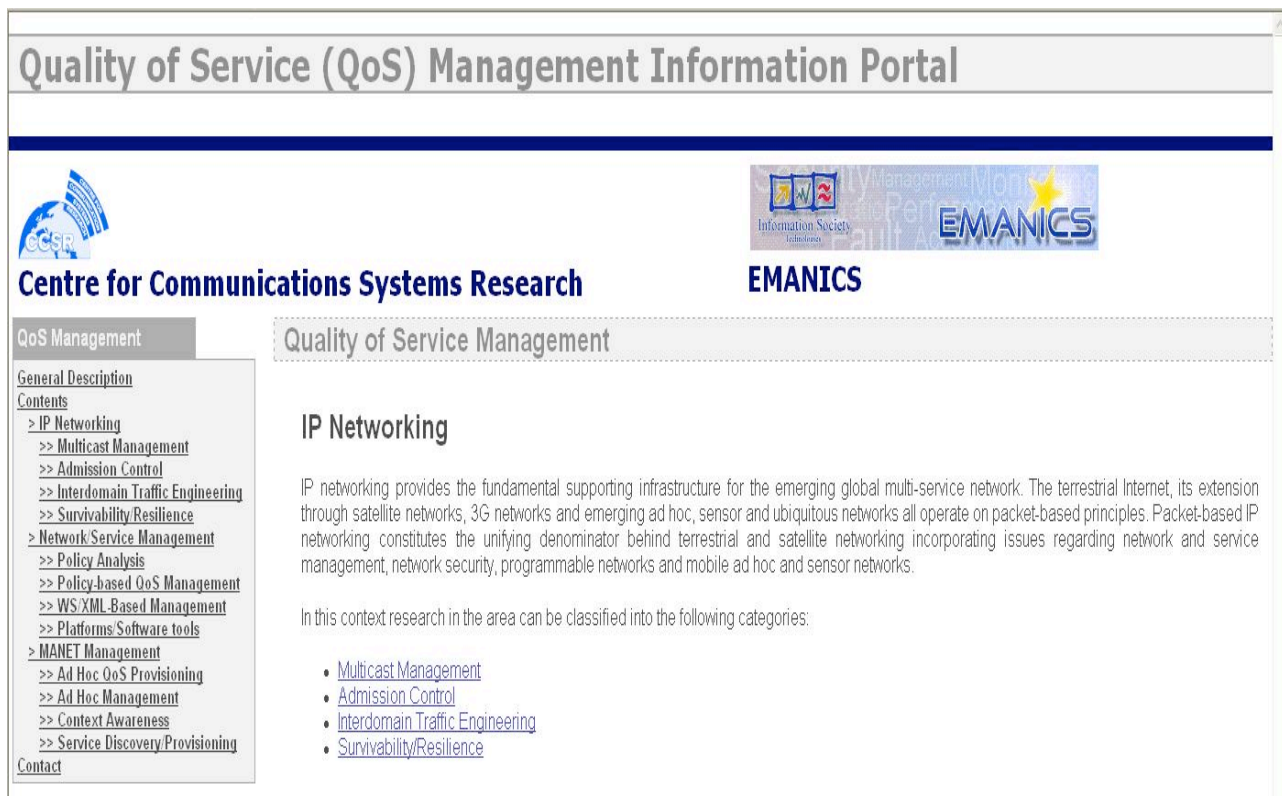


Figure 22 IP Networking group content page

Group content pages collect links about individual content pages of semantically related content, provide a general description of the overall content category and serve as a focal point for that category to be accessed in a common manner. Individual content pages hold the same structure and describe in a tutorial nature the particular topic. In its current status we have deployed 5 group content pages:

- Main page (Figure 20)
- General description & contents
- IP networking (Figure 22)
- Network/Service management
- MANET management

Similarly, we have implemented and provided appropriately structured content for the following individual content pages:

- Multicast management
- Admission control
- Interdomain traffic engineering (Figure 23)
- Survivability / Resilience
- Policy Analysis
- Policy-based QoS Management
- Web services / XML –based management
- MANET management
- Context-awareness
- Service discovery/provisioning

Quality of Service (QoS) Management Information Portal

Centre for Communications Systems Research **EMANICS**

QoS Management

Quality of Service Management

Interdomain Traffic Engineering

In recent years, there has been a tremendous growth of Internet users primarily due to the emergence of multimedia applications and services. With the rapid growth in Internet traffic, Internet Service Providers (ISP) acknowledge that network management is important for which to manage their networks efficiently. In particular, ISPs attempt to control traffic routing in their networks in order to optimize the usage of their network resources. Traffic Engineering (TE) is the set of techniques that optimize operational IP network performance. ISPs may use TE to dimension their networks in order to maximize the ability in carrying future customer traffic demands. As the Internet is hierarchically structured, TE can be divided into two types: intradomain and interdomain. In intradomain TE, the operator of an AS controls traffic routing within the network by either optimizing the link weights of the corresponding routing protocols or establishing Label Switched Paths (LSPs) through MultiProtocol Label Switching (MPLS). Typical intradomain TE optimization objectives are to minimize network bandwidth consumption and to achieve load balancing within the network. In fact, most of the previous work after the concept of TE was introduced focused on intradomain TE. However, since it has been discovered that interdomain resources are frequently congestion points and typically incurred with charges, optimizing their resource utilization has become necessary. Therefore, the aim of interdomain TE is to control traffic across multiple domains using optimization objectives such as to achieve load balancing over interdomain resources and/or to minimize peering costs.

This section of the Quality of Service Management Information Portal serves as a focal point for research related to interdomain traffic engineering. Related research has been classified into the following categories:

- [General Description](#)
- [Tutorials/Presentations](#)
- [Publications](#)
- [Related Links](#)
- [Dissemination](#)
 - [Journals](#)
 - [Conferences](#)
 - [Technical Societies](#)
- [Software/Tools](#)

General Description

Figure 23 Interdomain traffic engineering individual content page

Tutorials/Presentations

- [W3 Tutorials on XML tools](#)
- [IBM Web Services Tutorial](#)

Publications

- G. Pavlou, P. Flegkas, S. Gouveris, A. Liotta, "On Management Technologies and the Potential of Web Services", University of Surrey, XML Based Network Management in IEEE communications Magazine, Volume 42, Issue 7, July 2004, pp 58 - 66. [On Management Technologies and the Potential of Web Services](#)
- R. Boutaba, W. Golab and Y. Iraqi, "Lightpaths on Demand: A web-services-based management system", University of Waterloo Bill St. Arnauld, CANARIE Inc, XML Based Network Management in IEEE communications Magazine, Volume 42, Issue 7, July 2004 pp. 101 to 107. [Lightpaths on Demand: A web-services-based management system](#)
- Mi-Jung Choi, Hyoun-Mi Choi, and James W. Hong, Hong-Taek Ju, "XML Based Configuration Management for IP network devices", Keimyung University, XML Based Network Management in IEEE communications Magazine, Volume 42, Issue 7, July 2004 pp. 84 to 91. [XML Based Configuration Management for IP network devices](#)
- Lawrence E. Menten, Bell Laboratories, "Experiences in the Application of XML for Device Management", Keimyung University, XML Based Network Management in IEEE communications Magazine, Volume 42, Issue 7, July 2004, pp. 92 to 100. [Experiences in the Application of XML Device Management](#)
- Torsten Klie and Frank Strauß Technical University of Braunschweig, "Integrating SNMP agents with XML-Based Management Systems", XM Based Network Management in IEEE communications Magazine, Volume 42, Issue 7, July 2004, pp. 76 - 83. [Integrating SNMP agents with XML Based Management Systems](#)
- Torsten Klie and Frank Strauß Technical University of Braunschweig, "Towards XML oriented Internet Management", 2003, IFIP/IEEE 8th International Symposium on Integrated Network Management, 24-28 March 2003 pp. 505 to 518. [Towards XML oriented Internet Management](#)
- "HTTP Asynchronous Client Notifications", Technical whitepaper by Clipcode.com. [HTTP Asynchronous Client Notifications](#)
- Jean Philippe Martin-Flatin "Web Based Management of IP Networks and Systems", Wiley Series in Communications Networking and Distributed Systems, Copyright 2003.
- George Pavlou "OSI Systems Management, Internet SNMP and ODP/OMG CORBA as Technologies for Telecommunications Network Management", Department of Computer Science, UCL Gower Street, London WC1E 6BT, UK, Book Draft 2.0. [OSI Systems Management, Internet SNMP and ODP/OMG CORBA as Technologies for Telecommunications Network Management](#)
- Jorge E. Lopez de Vergara, Universidad Autonoma de Madrid, Victor A Villagra and Julio Berrocal, Universidad Politecnica de Madrid "Applying the web ontology language to management information definitions", IEEE Communications Magazine, Volume 42, Issue 7, July 2004, pp. 68 74. [Applying the web ontology language to management information definitions](#)
- George Pavlou University of Surrey, Antonio Liotta UCL, Paola Abbi Italian HP and Stefano Ceri Politecnico di Milano "CMIS/P++ Extensions CMIS/P for Increased Expressiveness and Efficiency in the Manipulation of Management Information", INFOCOM '98. Seventeenth Annual Joint Conference of the IEEE Computer and Communications Societies, Proceedings, IEEE Volume 2, 29 March-2 April 1998 pp. 430 to 438. [CMIS/P++ Extensions to CMIS/P for Increased Expressiveness and Efficiency in the Manipulation of Management Information](#)
- R. Enns, Juniper Networks "NETCONF Configuration Protocol", Network Working Group, draft-ietf-netconf-prot-12, March 2006. [NETCONF Configuration Protocol](#)
- T. Goddard ICESoft Technologies Inc, "NETCONF over SOAP Using the Network Configuration Protocol over the Simple Object Access Protocol", Network Working Group, draft-ietf-netconf-soap-08, March 2006. [NETCONF over SOAP Using the Network Configuration Protocol over the Simple Object Access Protocol](#)
- M. Wasserman ThingMagic, T. Goddard ICESoft Technologies Inc "NETCONF over SSH Using the NETCONF Configuration Protocol over Secure Shell", Network Working Group, draft-ietf-netconf-ssh-06.txt, March 2006. [NETCONF over SSH Using the NETCONF Configuration Protocol over Secure Shell](#)

Figure 24 Tutorials and publications sections of the WS-management content page

Related Links

- [European Network of Excellence for the Management of Internet Technologies and Complex Services \(EMANICS\)](#)
 - [EPSRC PAQMAN - Policy Analysis for Quality of Service Management](#)
 - [IC Policy Research Group](#)
 - [IBM PMAC](#)
-

Dissemination

The list of journals, conferences and technical societies related to Policy Analysis does not mean to be exhaustive rather it is indicative. For additions/updates please contact the webmaster.

Journals

- [IEEE eTransactions on Network and Service Management](#)
- [Journal of Network and Systems Management](#)
- [IEEE Transactions on Software Engineering](#)
- [IEEE Communications](#)
- [IEEE Journal on Selected Areas in Communications](#)

Conferences

- [IEEE Network Operations and Management Symposium \(NOMS\)](#)
- [IEEE/IFIP International Symposium on Integrated Network Management \(IM\)](#)
- [IEEE International Workshop on Policies for Distributed Systems and Networks \(POLICY\)](#)
- [IFIP/IEEE International Workshop on Distributed Systems: Operations and Management \(DSOM\)](#)

Technical Societies

Software/Tools

- [Java™ Technology](#)
- [Prolog](#)
- [The Ponder Policy Specification Language](#)
- [IBM PMAC](#)

Figure 25 Related links, software tools and dissemination sections of policy-based management content page

Based on the previous analysis we have produced the design of the information portal used for the network and service management content integration. The design choices we made are justified by the previous discussion and are in compliance to the requirements analysis performed. The structure of the information portal will be hierarchical. The top level, main entry point of the information portal will be devoted to the general category titled “QoS Management”. Furthermore, the rest of the sub-categories and sub-topics will be structured and will be accessible using a tree structure under this main entry point. In this way the user can semantically navigate in the information portal to locate desired information, as well as information related to that.

<pre> body { margin: 0 0 0 0; color: #808080; font-family: arial, verdana; } .logo{ border-style: solid; border-width: 10 0 0 0; border-color: #000066; font-family: Verdana; font-size: large; color: #000066; font-weight: bold; padding: 10px; text-decoration: none; } .logo a, .logo a:link , .logo a:visited , .logo a:hover , .logo a:active { font-family: Verdana; font-size: large; color: #000066; font-weight: bold; text-decoration: none; } P { font-family: Arial; text-align:justify; } .projecttitle , .projecttitle a , .projecttitle a:hover , .projecttitle a:active { border-style: solid; border-width: 2 0 2 0; border-color: #a0a0a0; background-color: #f0f0f0; font-family: Verdana; font-size: x-large; color: #808080; font-weight: bold; margin-top: 15px; margin-bottom: 30px; padding-left:10px; text-decoration: none; } .projecttitle a:link, .projecttitle a:visited { color: #4040B0; text-decoration: underline; } .leftmenu { width: 265px; float: left; background-color: #f0f0f0; font-size: x-small; font-weight:bold; border-style: solid; border-width: 1 1 1 1; border-color: #a0a0a0; color: #404040; margin-right: 10px; margin-left: 2px; padding: 4px; </pre>	<pre> .leftmenu a, .leftmenu a:link , .leftmenu a:visited , .leftmenu a:hover , .leftmenu a:active { color: #404040; text-decoration: underline; } .leftmenutitle, .leftmenutitle a, .leftmenutitle a:link , .leftmenutitle a:visited , .leftmenutitle a:hover , .leftmenutitle a:active { width: 200px; float: left; background-color: #a0a0a0; color: #f0f0f0; font-weight: bold; font-size: small; border-style: solid; border-width: 1 1 1 1; border-color: #a0a0a0; margin-right: 10px; margin-left: 2px; padding: 4px; } .title { color: #808080; background-color: #f0f0f0; border-style: dashed; border-width: 1 1 1 1; border-color: #a0a0a0; font-family: arial; font-size: large; margin-bottom: 10pt; padding-left: 10px; width: 100%; } .title a:link , .title a:visited , .title a:active { color: #4040B0; text-decoration: underline; } .content { color: #404040; float: both; border-width: 1 1 1 1; border-color: #a0a0a0; font-family: arial; font-size: small; margin-left: 15px; margin-right: 15px; margin-bottom: 15pt; padding-left: 15px; } .content a:link , .content a:visited , .content a:active { color: #4040B0; text-decoration: underline; } </pre>
--	--

Figure 26 CSS used to ensure uniform presentation of QoS Information Portal pages

Each category page has a common web design in terms of user interface and general content classification. The content itself is presented to the users through the individual content pages in the following layout, as identified by the functional requirements of the information portal:

- General information regarding the topic

- Tutorials and initial material (i.e. online presentations) for basic understanding of the domain
- Research publications and technical reports
- Open-source software in the area
- Active conferences/workshops/meetings in the area
- Calls for papers related to the topic
- Related journals and news events/updates/bulletins
- Related links to the particular topics

In what follows we provide screenshots of the various parts of individual content pages presenting the general information and page navigation part (Figure 23), tutorials and publications (Figure 24), software tools, related links and dissemination (Figure 25).

To achieve uniform design of the web pages we exploited the Cascading Style Sheets (CSS) technology. In particular the CSS style we adopted is presented in Figure 26.

Nevertheless, in order to ensure extensibility and manageability of the information portal the generic design we have presented is not adequate. The technical aspects of the design require equally cautious consideration and planning as far as implementation and deployment are concerned. The technologies that will be used should allow the generic implementation and allow for ease of deployment and effortless introduction of new content or update of existing one. In this sense, we propose exploiting XML technologies for storing the content information and XSLT for the presentation of the content through the information portal. The validation of the content-filled XML documents for reasons of consistency will be performed and guaranteed with the use of XSD documents describing the features necessary to be held by every conformant XML document. Figure 27 presents an excerpt of the XML document used to store the content information stored in XML documents. It refers to research publications. The list of publications is retained in BibTex format (the bibliographic system for use with LaTeX, which is widely adopted by the scientific community) and we use the open-source tool BibTeXXML (<http://bibtexml.sourceforge.net/>) to transform it to XML. Other content incorporated in the content pages is stored in XML from the beginning. The corresponding excerpt of an XML document is displayed in Figure 27 that also illustrates the XSLT code used to transform the stored information into HTML code that feeds the relevant individual content page. We apply the XSL transformation beforehand using the open-source tool XMLStarlet (<http://xmlstar.sourceforge.net/>) and we only make available the derived HTML code in the information portal. This way we avoid browser-dependent solutions to dynamically generate the HTML code through the XML documents.

The deployment of the web-based information portal that will serve as the future environment for content integration has been performed and can be accessed through <http://www.ee.surrey.ac.uk/Personal/G.Pavlou/projects/Emanics/qos-portal/main.html>.

Initial results on user satisfaction regarding the user interface, the usability and accessibility of the information portal are highly anticipated to guide the optimisation of it and serve as guidelines for potential modifications.

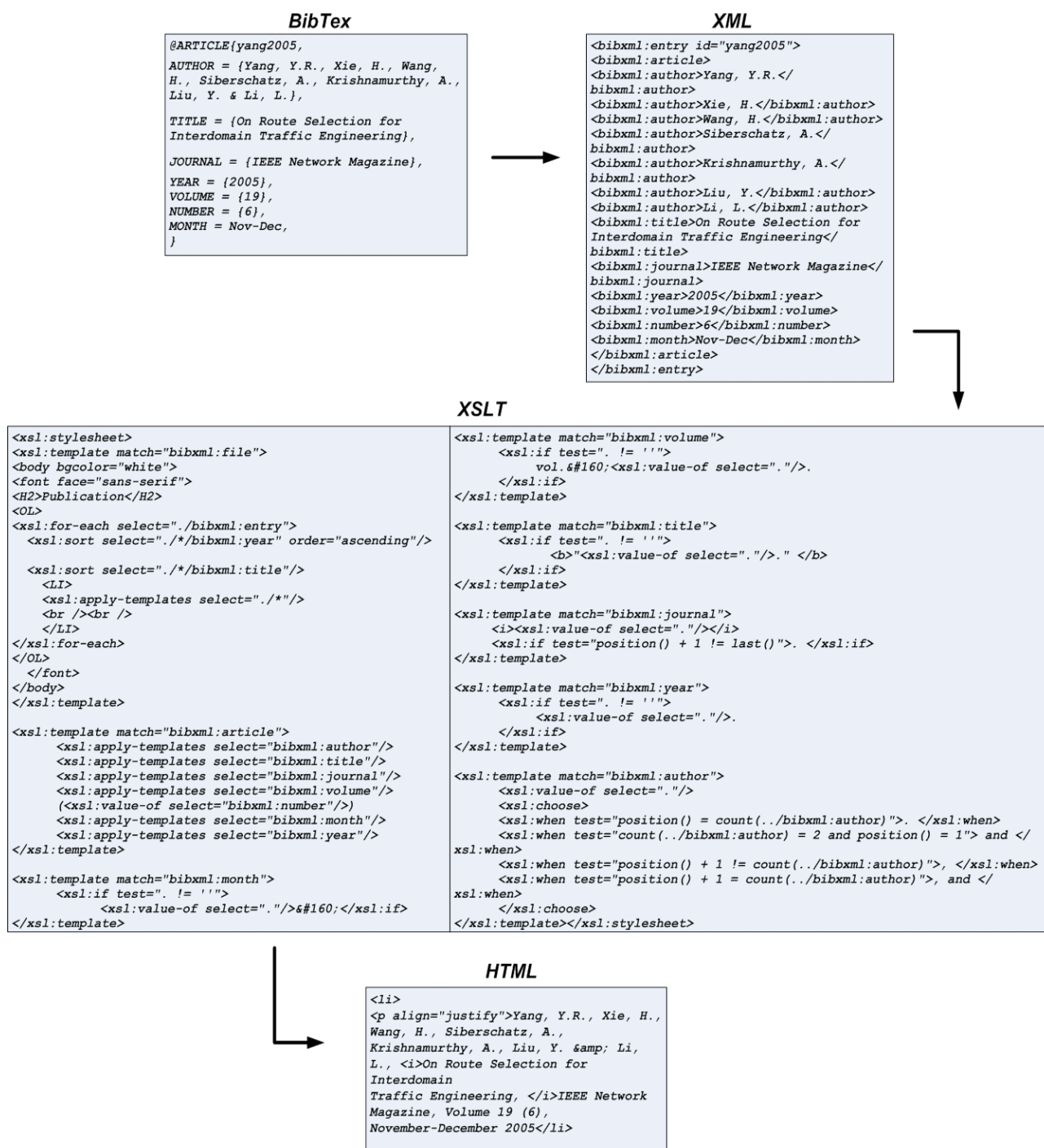


Figure 27 XML, XSLT and HTML code for publications sections in content page

Amongst the key points that we will be focusing on in our future research are the following:

- Use user experience to assess the information portal's usability and user-friendliness
- Expand the content integration into other fields of network and service management

-
- Allow for dynamic integration of content, on a first stage from authorised EMANICS partners and on second stage from a wider community in a collaborative Wiki-like environment

4 Collaboration environment

The private web site with its dynamic content upload facilities is a good tool to provide the collaboration environment. Other services may also be required.

4.1 The EMANICS private web site

The private area of the EMANICS site is accessible only for project participants. There are defined individual login names and passwords with different access levels and permissions depending on responsibility and status within the project. The Coordinator partner has the administrative privileges and is responsible for the creation of user accounts and setting appropriate privileges. Users have to login with username and password to access the private area. Figure 28 depicts the private area login page, whilst Figure 29 depicts the welcome page of this area and Table 1 its corresponding structure.

The private part of the Web site allows project participant to:

- Share documents and files
- Provide information about past and future meetings
- Access official project documents
- Collaborate on particular tasks within work packages using a Wikipedia-like interface
- Access deliverables list per due date and deliverables repository

Figure 30 presents the Wikipedia-like interface which allows every partner to provide the description of tasks he/she is responsible for. The Wikipedia syntax is very intuitive and popular in today Internet community so it gives the possibility to quickly update the articles on the private Web site.

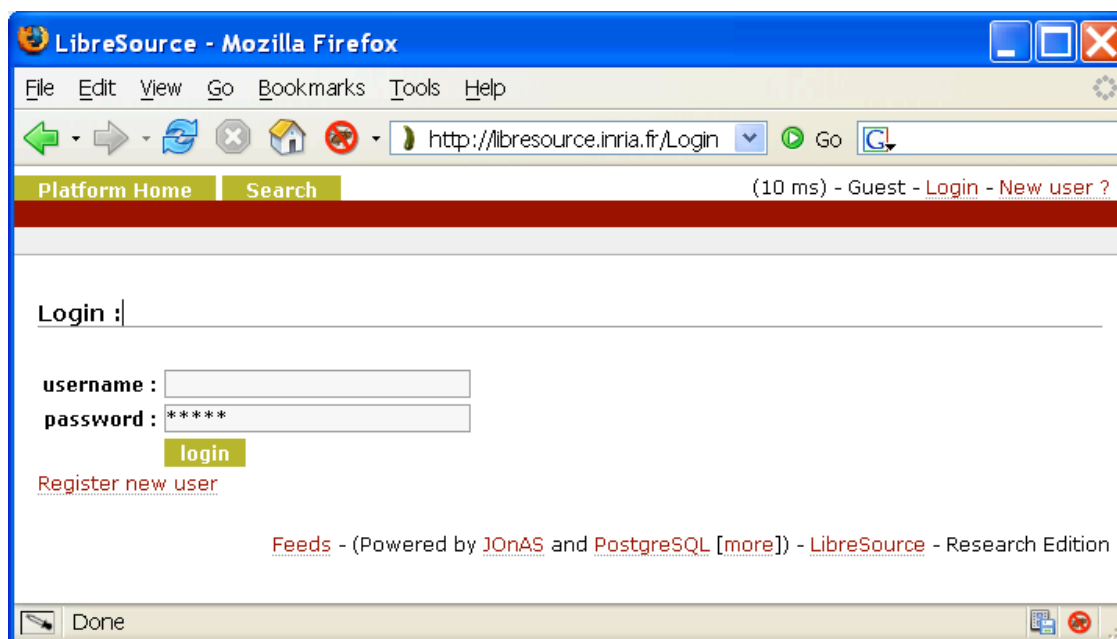


Figure 28. Private area login page

LibreSource - EMANICS - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://libresource.inria.fr/projects/emanics/

LibreSource - EMANICS

Home Search My Page

Bartosz Gajda - Logout

location : /projects/emanics

Project

- EMANICS Public Home
- Collaborative Server Home
- NoE Presentations
- Open Positions
- Workpackages

Deliverables & Documents

- Deliverables List
- EMANICS Published Papers

Meetings

- General Assembly 15-17 January 2007 Meetings

Contract and Finance

- Contract Data
- Consortium Agreement
- Budget
- Execom Internal
- FAQ & EMANICS Guide
- EMANICS Mailing Lists

Phase II DOW Elaboration

- Calendar and DoW
- Phase 2 Discussion Forum



Internal Document Upload Center

- Documents Repository Area

EMANICS [more](#)

Documents of the EMANICS european project

Edit this page - Last edited by Olivier Festor at Feb 23, 2006 12:13 PM

Welcome the EMANICS Libre Source Environment dedicated to EMANICS Members

to go back to the EMANICS public site click :

<http://www.emanics.org>

[Printable version](#) - [Feeds](#) - (Powered by [JOnAS](#) and [PostgreSQL](#) [\[more\]](#)) - LibreSource - Community Edition - (134 ms)

Figure 29. EMANICS private area

Table 1. EMANICS private area structure

First level item name	Second level menu item name	Description of the content	Type of content (static, dynamic)
Project	EMANICS Public Home	Link to EMANICS public website	static
	Collaborative Server Home	EMANICS Libre Source Environment start page	static
	Overview	Overview of private area site	dynamic
	NoE Presentations	Lists of presentations with links to files	dynamic
	Open Positions	Announcements of open positions at project participants	
	Workpackages	List of packages with links to Wikipages with sub pages of activities, tasks and other descriptions	static
Deliverables & Documents	Deliverables List	Table with list of Deliverables per Due Date	dynamic
	EMANICS Published Papers	List of published papers with links to files	dynamic
Meetings	General Assembly 15-17 January 2007	Information concerning General Assembly 15-17 January 2007 in London	
	Meetings	List of meetings with links to Wikipages with sub pages containing meetings minutes, presentations, files etc	dynamic
Contract and Finance	Contract and Finance	List of contract documents with links to files	dynamic
	Consortium Agreement	Consortium Agreement documents	dynamic
	Budget	Budget related documents	dynamic
	ExeCom Internal	Executive committee internal area	dynamic
	FAQ & EMANICS Guide	This page is dedicated to provide answers to common questions that were raised within the network of excellence and which aim at helping the EMANICS citizen in its daily life	dynamic
	EMANICS Mailing Lists	List of mailing lists with description and explanation how to subscribe	
Phase II DOW Elaboration	Calendar and DoW	This Wiki is dedicated to the elaboration of the Description of Work for the second phase of EMANICS.	dynamic
	Phase 2 Discussion Forum	The forum on which all phase 2 DOW related discussion will take place.	dynamic

Internal Document Upload Centre	Documents Repository Area	The area where all EMANICS documents are stored.	dynamic
--	----------------------------------	---	---------

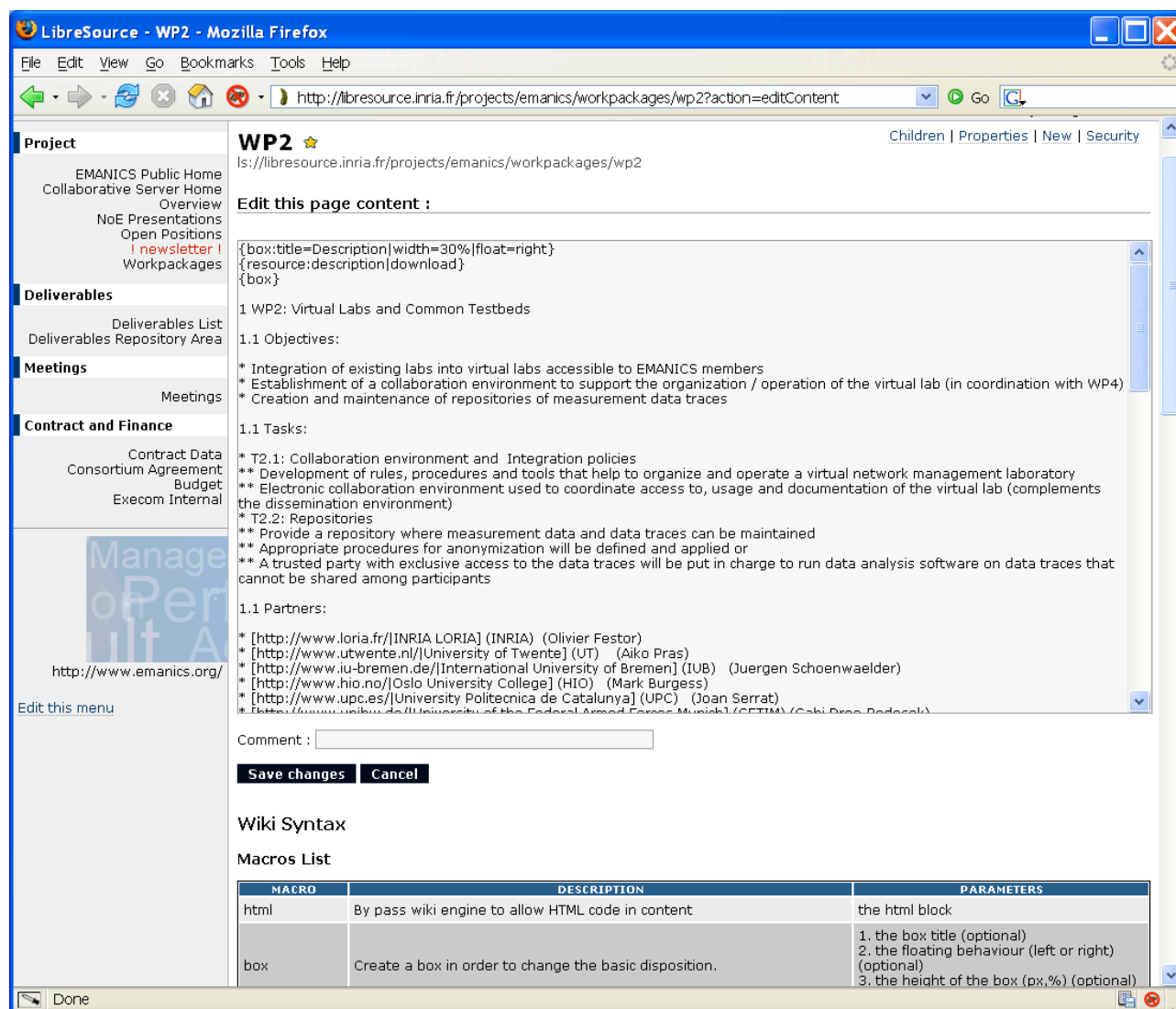


Figure 30. Wikipedia collaboration environment on the EMANICS private area

4.2 On-line forms service

Workpackage 4 was also entrusted to provide a service consisting in a set of on-line forms allowing partners to apply for funding as a consequence of the execution of a set of activities pre established by the Executive Committee. Since the beginning of the project a total of eight activities were defined, namely:

- Publication of books

- Attendance to conferences and summer schools
- Attendance to standardization meetings
- Publication of papers in magazines and conference proceedings
- Participation in PhD committees
- PhD student mobility
- Short term scientific visits
- Setup of courses, tutorials and training activities

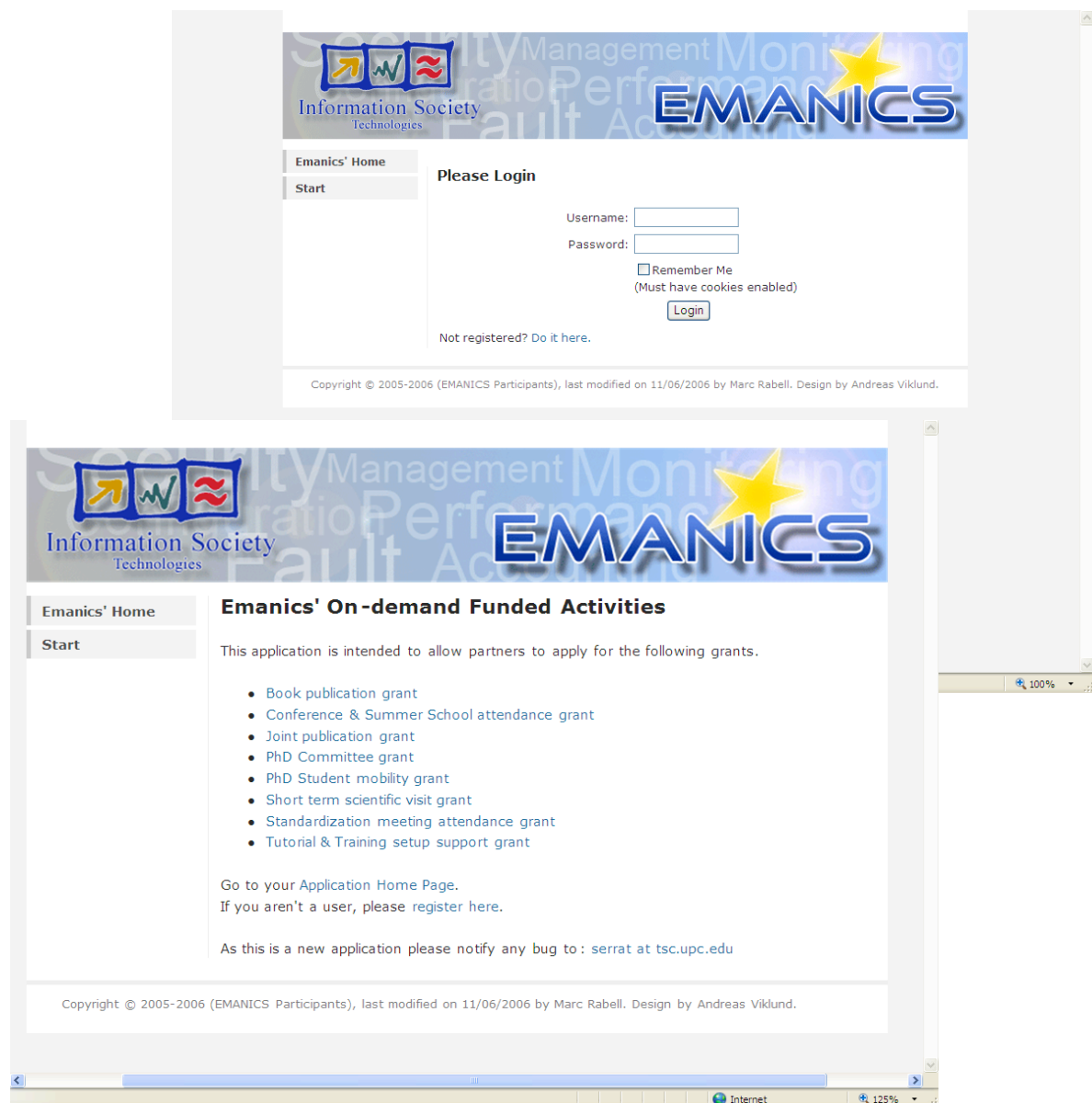


Figure 31. Welcome and Login pages of the EMANICS Application Forms

Each EMANICS participant is invited to carry out these activities and apply for the associated funding. The Executive Committee decides on the applications granting or not the corresponding requests.

The main requirement for this service was to make it completely automatic but at the same time providing a few set of management tools to carry out the most usual maintenance operations. Also it should look like other on-line submission applications encountered nowadays in the Internet.

The software comes from an open source template that was customized accordingly. The programming language is PHP. The service is hosted in a conventional Apache server and makes use of an SQL database.

4.2.1 Access rights

We distinguish three categories of users; namely User, ExeCom member and Administrator.

➤ User

Allowed to submit applications, view the cumulative amount of funding assigned to his/her institution and the applications already submitted. These applications can have the status of pending, in case that has not yet been reviewed by the Executive Committee, or closed which in turn are classified as accepted or rejected. A registration process collecting the main data of individuals is available on-line.

Figure 31 shows the Start page of the application listing the 8 types of available templates. Clicking one of these links a prefilled template shows up. The other links available in this page invite to register or to go to the home page of the user. In this case the window of the back appears to allow introducing username and password. These variables have been selected at the registration process. Figure 32 shows the home page of a registered User. In this case his first name is Martin and he belongs to the team of UPC. This user has a pending request of a joint publication, submitted the 22nd of December, three accepted requests and five rejected.



Figure 32. A User's home page

➤ ExeCom member

Allowed to accept or reject still pending applications and view any closed application from any User. A filtering process allows the selection of applications according to their status, partner (institution) to which the requestors belong to, the member of the Executive Committee who did the review and by submission time. Also the

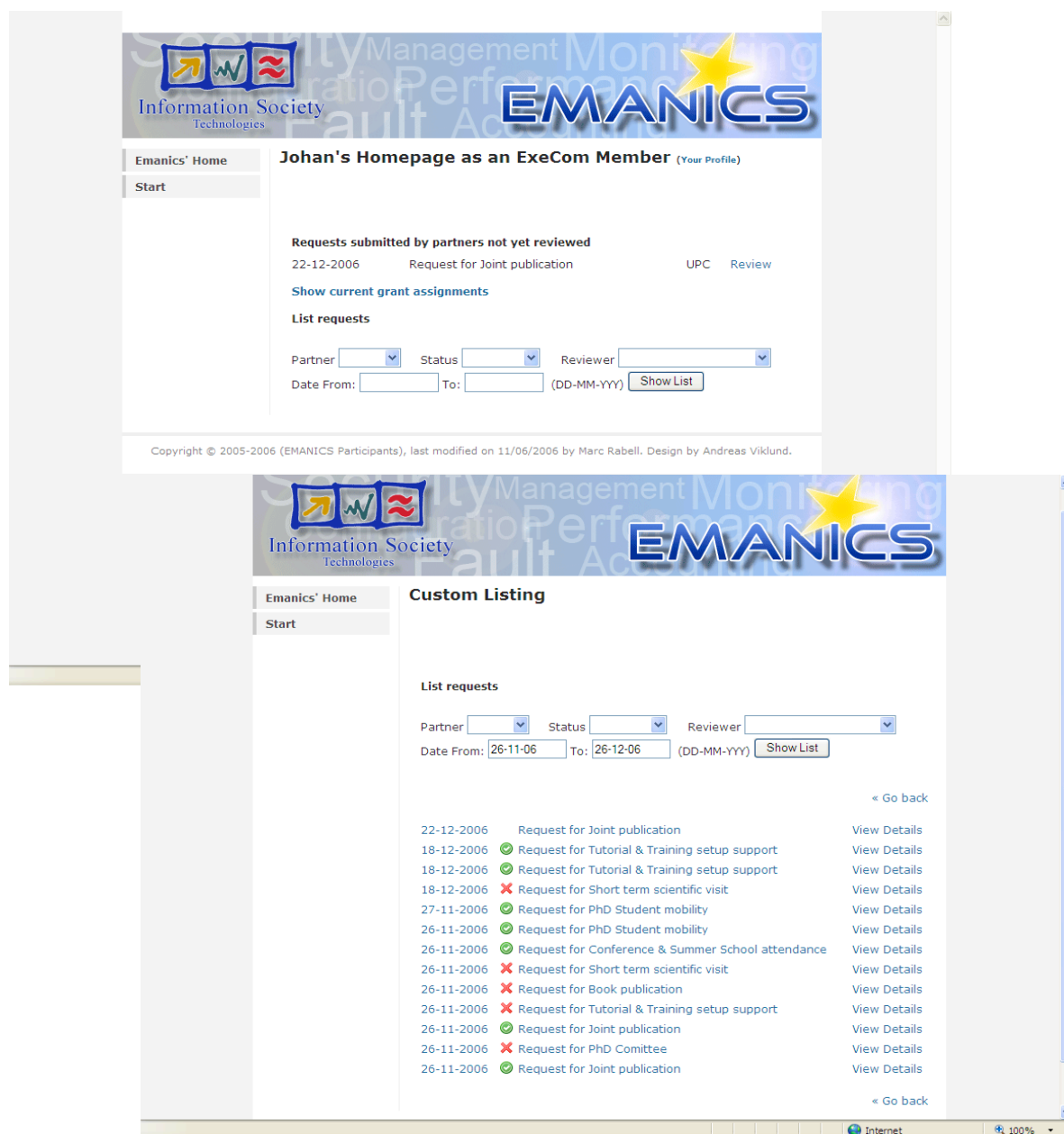


Figure 33. Welcome page of an ExeCom member (back) and selective listing by dates (front)

ExeCom member is able to see the cumulated funding assigned to all partners. This member category is assigned only by the Administrator.

Figure 33 shows the welcome, or Start page of the ExeCom member (back). In this case his name is Johan and he can see one application only still pending of review. This is precisely the application of the user Martin mentioned above. The front of the

same figure shows the result of listing all the applications from 26 November to 26 December. Note that the still pending one is also included in addition of the accepted and rejected ones fulfilling the selection criteria.

➤ Administrator

Allowed to create/delete/edit users, modify their access rights and change the amount of cumulative funding assigned to any partner. More than one Administrator is allowed.

4.2.2 Common workflows

The application is accessible through the link Application Forms, a sub menu of Members Area of the EMANICS site. The initial screen allows to introduce username and password or to register in case of non-registered users. Every time a new user registers in the system the Administrators receive a notification e-mail with the data of the new user.

4.2.2.1 Submission of an application

The User opens a request using one of the 8 templates available. He must fill data and likely attach a file or files. Once completed he pushes the submission button

Figure 34. The Joint Publication template ready to be filled

Figure 34 shows the joint publication template. The others look similar; several text fields, most of them mandatory, and one or more browsing windows to include files. If the template is not properly filled it is not submitted.

The submission of the template causes the upload of the template and associated files in the database. In addition, a notification e-mail to all ExeCom members is also issued. A new link in the pending request list is added in both the screen of the ExeCom members and the screen of the User who did the request. Through these links, Users can view the data of their pending requests and ExeCom members can carry out the review process

4.2.2.2 Review of an application

Any of the existing ExeCom members can take the role of processing the request. Entering as an ExeCom member the list of all pending requests is displayed. Then he/she clicks the request to be reviewed and the data of the template opens. Files attached are also available through corresponding links. At the end of the page the ExeCom member is allowed to introduce the amount of money to be granted or the reason for denying it.

As soon as the ExeCom member takes the decision to accept/reject the request a notification e-mail is sent to the requestor. If the response is positive it will indicate the assigned funding. If negative it will indicate the reason. Additional information can be optionally provided. In addition, the associated requests status is switched to the appropriate one (accepted/rejected) in both the screen of the requestor and the screen of the ExeCom members.

5 Summary and Conclusions

The objective of EMANICS WP4 is twofold. First, to create the appropriate electronic dissemination environment to facilitate the presentation of knowledge on network and service management to the public and more particularly to the European based industry and academia and second, to create the appropriate collaboration environment aimed to allow EMANICS partners and participants to fulfil their intended cooperation and integration objectives. After one year of work both the electronic dissemination environment and the collaborative environment are set and operational and the bases for future improvement and evolution are well established. In the following paragraphs we argue about, according to the achievements summarized in this deliverable.

Concerning the creation of the dissemination environment we have described the architecture of the EMANICS web site that employs the most advanced development and dissemination resources in nowadays web sites. A key aspect of this web site is that is conceived as to be fed directly by all the EMANICS participants. Therefore, only the structure is fixed but most of its content is completely dynamic and in this sense its maintenance is not dependent on an administrator with all the inherent advantages that it comes through. The content management system adopted has proven to be powerful and flexible enough to reach this goal. The web site is today fully operational making the EMANICS network of Excellence visible worldwide. Looking forward, we envisage improvements in terms of security and also making the EMANICS site impact as much high as possible.

In respect to the dissemination of content properly said, the EMANICS dissemination policy is not conceived as self contained process. Many other initiatives in the field of network and service management were set up before and have arrived today with different success. Therefore it makes sense to take advantage of these initiatives and use EMANICS as a complement instead of a replacement. We have already put in practice this concept with a clear interaction between the EMANICS site and the Simpleweb. The former takes advantage of already established call for papers and conference announcements and the Simpleweb is nowadays being extended in non-overlapping areas thanks to the support and impulse of EMANICS. The EMANICS site and the Simpleweb are today seamlessly “connected” through RSS feeds. The same approach could be adopted in the future with other sites. On the other hand, we have collected information concerning QoS Management and structured such information in a specialized portal. The outcome of this activity is twofold because in addition to the undoubted value that this information portal is bringing, we have also set up the bases for its future extension to other fields of network and service management. In fact, the focus of WP4 in the second phase of the project will be put on the use of the environment developed so far to disseminate as much content as possible.

Still in the dissemination area is worthy to mention the already established EMANICS newsletter. Produced quarterly (April, August and December) it describes the cooperation initiatives among partners and relates a summary of events like conferences, meetings, etc. It is in fact a selection of information already available through the web but selected and presented in a condensed way by the editorial board. The newsletter is published through the web and distributed on paper in most of the network and service management conferences. Also a subscription mechanism to receive it via e-mail has been developed.

EMANICS is wishing also to investigate and learn about less conventional electronic dissemination means. In this sense, we have concluded an activity conceived to investigate different tools for podcast production and playback. We have today the podcast of one of the key events of the last NOMS conference, the distinguished expert's panel. But more important than the content itself is that the EMANICS team has a background in this technology that allows for producing other podcast in the near future. Improvement in the already experimented media but also investigation of newer ones is the target of this branch of WP4

The cooperative environment has been also another of our targets. Essentially covered by a private branch of the EMANICS site, it allows for exchange of documents produced in the different workpackages as well as the submission of forms adopted in the consortium for requesting funding. Looking at the future we plan to improve also this cooperative environment making it more automatic and functional.

6 References

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Abbreviations

CMS	Content Management System
CSS	Cascading Style Sheets
DEP	Distinguished Experts Panel
DoW	Document of Work
ExeCom	Executive Committee
HTML	HyperText Markup Language
MANET	Mobile Ad-hoc Networks
NoE	Network of Excellence
PHP	PHP Hypertext Preprocessor
PNG	Portable Network Graphics
QoS	Quality of Service
RSS	Really Simple Syndication
SQL	Structured Query Language
URL	Uniform Resource Locator
XML	eXtended Markup Language
XSD	XML Schema Definition
XSL	eXtensible Stylesheet Language
XSLT	eXtensible Stylesheet Language Transformations